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in 'l'Acerba,' by Cecco d'Ascoli, is of the vaguest description.

A curious misquotation occurs in the bibliography of the older literature contained in Agassiz's 'Poissons Fossiles,' where 'Les Observations sur l'histoire naturelle, sur la physique,' etc., 'an anonymous work in six volumes,' is credited to Gauthier. The title obviously refers to the journal conducted for twenty years under that name by the Abbé Rozier, and continued after 1794 as the *Journal de Physique*. The author of the alleged anonymous communication on Bolca fishes cited by Agassiz at the end of his bibliography was the celebrated geologist Albert Fortis, his correspondence with Testa having been collected and published in book form by Count Gazola in 1793 and 1794.

To devote attention to minor minutæ of this nature will no doubt be esteemed by many as 'time elaborately thrown away.' But it must be conceded that accuracy even in smaller matters possesses an intrinsic virtue, and is as well worth striving for as are the third and fourth decimal places in mathematics, *Cui bono* may not be translated into the parlance of ideal scholarship.

C. R. EASTMAN.

HARVARD UNIVERSITY,
CAMBRIDGE, MASS.

BOTANICAL NOTES.

ECOLOGICAL PLANT STUDIES.

PROFESSOR ATKINSON has recently issued a pamphlet of sixty-seven pages giving the outlines of a course of twenty-one lectures on the relation of plants to environment, delivered in the Summer School of Cornell University in 1903 and 1904. Contrary to the views of some 'ecologists,' the professor devotes a good deal of time (nine lectures) to a study of the structure of plants, under such headings as the organization of the plant, plant tissues, types of stems, foliage-leaves, root, flower-shoot, pollination, fruit and distribution, before taking up ecology proper. Under the latter appear such titles as ecological factors, vegetation types, plant migration, plant formations, forest societies, etc. While these lectures are merely outlined, it is not difficult to

see that we have here a rational and logical presentation of this much-abused and generally badly taught subject.

From Professor Clements we have in the table of contents of an ecological work by him, now in press, a similar outline of another phase of the subject. This work (which will cover about 300 pages) is to be devoted to research methods in ecology, treated under four heads or chapters: (1) foundations of ecology, (2) the habitat, (3) the plant formation and (4) experimental ecology. Under the first are discussed the need of and the essentials of a system in ecology; under the second, the factors (water content, humidity, light, temperature, wind, precipitation, air-pressure, soil, etc.) and their measurement by instruments. The third chapter deals with the methods of research, the quadrat, transect, migration circle, photography, cartography and herbaria. In the fourth chapter, devoted to experimental ecology, the purpose and the scope are set forth, followed by a discussion of methods of field experiment, control experiments, comparative morphology and competition cultures. A book of this kind should go far towards correcting the looseness which has characterized too much of the work in ecology. It is to be brought out by the botanical seminar of the University of Nebraska.

ANIMALS IN THE PLANT KINGDOM.

No doubt many a botanist has felt that quite too many animal-like organisms have been included in the plant kingdom in recent years. The slime molds were originally included upon their superficial resemblance to the puff-balls, at a time when anything like a critical study of the biology of the organisms was unknown. De Bary long ago placed the slime molds 'outside the limits of the vegetable kingdom,' yet they are persistently retained in botanical manuals, and systems of plants. Thus they still hold their place in Engler's 'Syllabus der Pflanzenfamilien' in spite of his statement—'kein Anschluss an höhere Pflanzen.' Scientific consistency certainly demands their removal from the plant system. With them, also, should be cast out some much more recent animal intruders—the

Flagellatae, *Dinoflagellatae* and the *Silicoflagellatae*, which never had any good right to be included among plants. These are the things which are happily characterized by Dr. Thaxter in a recent article in the *Botanical Gazette*, as 'a menagerie of organisms whose zoology is orthodox to a degree.'

Why the botanists should be bothered with all these 'beasts' (as Dr. Gray would have called them) is a puzzle which has not yet been satisfactorily solved. Whether the purging of the membership of the plant kingdom should go further and result in the expulsion of *Volvox* and its near allies is difficult to decide. In everything but its color *Volvox* is an animal—and a very good one at that—but whether its assumption of its green coat is sufficient to hide its essentially animal nature in other respects is, perhaps, open to argument, especially since it is such a pretty and interesting organism for laboratory demonstrations. While we should like to retain it, we are compelled to say that in all probability it is to be relegated to Dr. Gray's domain of 'beasts.'

A FLORA OF PENNSYLVANIA.

NEARLY seventy years ago Dr. Thomas C. Porter began the collection and study of the plants of Pennsylvania, and until his death in 1901 he continued the work practically without interruption. At his death his manuscript was found to be essentially completed, needing only the editorial supervision of some one familiar with his ideas. Such an editor was found in Dr. J. K. Small, of the New York Botanical Garden, under whose direction the 'Flora of Pennsylvania' was brought out by Ginn, the Boston publisher. It is a synoptical flora, all descriptions of orders, families, genera and species being included in carefully made keys. Especial attention is given to habitat and distribution, and in this particular this is one of the most satisfactory floras ever published in this country.

The book contains about three hundred pages, exclusive of the very full indexes. It deals with the spermatophytes only, the ferns not being included, so that the word 'flora'

is strictly proper as applied to the book. It includes 2,201 species, representing 655 genera, 156 families and 43 orders. It is a great and enduring monument to the industry and ability of the author.

CHARLES E. BESSEY.

UNIVERSITY OF NEBRASKA.

AGRICULTURE IN JAPAN.*

ONLY 14,995,272 acres, or 15.7 per cent. of the whole area of Japan, exclusive of Formosa, consists of arable land, and 55 per cent. of the agricultural families cultivate less than 2 acres each; 30 per cent. cultivate 2 acres or more up to 1½ cho, or a little less than 3¾ acres, leaving 15 per cent. of the farmers who cultivate farms of 3¾ acres or more. A comparison of the whole area under cultivation with the number of farm workers shows that, on an average, one man cares for a little less than an acre.

The government has attempted to aid the progress of agriculture by laws respecting irrigation, the protection of forests so as to control the flow of rivers in the interest of the farmer, the formation of farmers' guilds, the rearrangement of farm boundaries, and the improvement of drainage systems. Small as the farms are, their parts are usually separated so that a farm of 2 acres may consist of several nonadjacent lots, the average size of a lot being about one eighth of an acre. A law which went into force in 1900 provides for the rearrangement of boundaries by farmers exchanging fields for those owned by others so as to make the farms more compact and enlarge the fields to permit the use of horses and machinery, at the same time increasing the tillable area by straightening some boundaries and removing others. About 20,000 acres have already come under the operation of this law.

For the purpose of further promoting agricultural interests the government maintains a State experimental farm and nine branch farms. The work at these farms is largely theoretical, and is divided into eight departments, viz., seed, saplings, agricultural chem-

* Consular report from United States Consul-General Bellows, Yokohama, Japan.